TABLE 7

Detailed Cost Estimate of Selected Remedy, Alternative 2D

Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost (Labor and Materials)	Estimated Cost
I. CAPITAL COSTS					
Site Preparation					
1	Pre-construction Field Survey	1	LS	$5,300	$5,300
2	Air Monitoring Program	420	DAY	$1,600	$672,000
3	Temporary Fencing	1	LS	$16,000	$16,000
4	Decontamination Area	1	EA	$37,000	$37,000
5	Temporary Construction Access Roads	1	LS	$85,000	$85,000
6	Clearing & Grubbing	20	AC	$13,000	$260,000
7	Temporary Steel Sheeting (Drive, Extract and Salvage: Means 31 41 16.10 0100)	564	TON	$2,200	$1,240,800
8	Utility Protection / Relocation	1	LS	$106,000	$106,000
9	Temporary Stormwater Management and Erosion and Sediment	1	LS	$265,000	$265,000
10	Well Abandonment	100	EA	$640	$64,000
				Site Preparation Subtotal:	**$2,751,100**
Excavation and Consolidation					
11	Survey	10	WK	$5,300	$53,000
12	Soil Removal and Consolidation	920000	CY	$13	$12,190,000
12a	Construction Water Treatment System	300	days	$11,000	$3,300,000
13	Confirmation Sampling	660	EA	$530	$349,800
14	Remove Sheet Pile Wall	2600	LF	$120	$312,000
15	Soil Removal and Consolidation (setback from creek)	0	CY	$13	$0
				Excavation and Consolidation Subtotal:	**$16,204,800**
Final Cover System					
16	Grade Verification Surveys	8	WK	$5,000	$40,000
17	Soil Grading Layer (Select Fill)	22,900	CY	$20	$458,000
18	Geotextile Separation Layer (8-oz/sy)	10,000	SY	$3	$25,000
19	Gas Venting Layer (Sand)	44,000	CY	$21	$924,000
20	Active Gas Venting System	28	EA	$95,000	$2,696,901
21	30-mil PVC Liner (or equivalent)	160,000	SY	$8	$1,280,000
22	Geotextile Cushion Layer (16-oz/sy)	160,000	SY	$5	$800,000
23	Soil Protection / Drainage Layer (Sand)	91,000	CY	$21	$1,911,000
24	Topsoil Layer	22,900	CY	$32	$732,800
25	Seed & Mulch	28	AC	$2,200	$62,455
				Final Cover System Subtotal:	**$8,930,155**
Permanent Stormwater Management					
28	Vegetated Swales	16,000	LF	$16	$256,000
29	Riprap-lined Swales	6,000	LF	$110	$660,000
30	Riprap Slope Protection	1	LS	$636,000	$636,000
31	Culverts	1,600	LF	$32	$51,200
32	Subsurface Drain Piping	8,000	LF	$48	$384,000
33	Stormwater Basins	2	EA	$84,800	$169,600
				Permanent Stormwater Management Subtotal:	**$2,156,800**
Restoration					
34	As-built Survey	6	WK	$5,300	$31,800
35	Backfill	400,000	CY	$21	$8,400,000
36	Topsoil	31,000	CY	$32	$992,000
37	Seed & Mulch	38	AC	$2,200	$83,600
38	Permanent Gravel Access Roads	1	LS	$265,000	$265,000
				Restoration Subtotal:	**$9,772,400**
Post-closure Monitoring Features Installation					
39	Installation of Permanent Gas Monitoring Probes	0	EA	$5,300	$0
40	Installation of Perimeter Gas Venting Trenches	0	SF	$21	$0
41	Installation of Post-closure Groundwater Monitoring Well Network	20	EA	$6,400	$128,000
				Post-closure Monitoring Features Installation Subtotal:	**$128,000**
				CAPITAL COST SUBTOTAL:	**$39,943,255**

TABLE 7

Cost Estimate for Remedial Alternative 2D

Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost (Labor and Materials)	Estimated Cost
				Subcontractor Performance and Payment Bonds (2% of Subtotal Capital Cost):	**$798,865**
				Mobilization/Demobilization (5% of Subtotal Capital Cost):	**$1,997,163**
				Administration, Design, and Construction Oversight:	**$5,000,000**
				Independent Construction Quality Assurance (10% of Final Cover System Capital Costs):	**$893,016**
				Contingency (20% of Subtotal Capital Cost):	**$7,988,651**
				TOTAL CAPITAL COST:	**$56,620,950**
II. OPERATION AND MAINTENANCE (O&M) COSTS				**Discount Rate**	**1.9%**
Post-closure Inspections & Maintenance		**Current Annual Cost**		**NPV Factor**	**NPV**
42	Years 1-5	$150,000	YR	4.73	$709,076
43	Years 6-30	$75,000	YR	17.98	$1,348,524
				Post-closure Inspections & Maintenance Subtotal:	**$2,057,600**
Post-closure Landfill Gas Monitoring & Reporting					
44	Years 1-5	$4,000	YR	4.73	$18,909
45	Years 6-30	$2,000	YR	17.98	$35,961
				Post-closure Landfill Gas Monitoring & Reporting Subtotal:	**$54,869**
Post-closure Groundwater Sampling & Reporting					
46	Years 1-5	$200,000	YR	4.73	$945,434
47	Years 6-30	$100,000	YR	17.98	$1,798,032
				Post-closure Groundwater Sampling & Reporting Subtotal:	**$2,743,466**
				O&M COST SUBTOTAL:	**$4,855,936**
				Contingency (20% of Subtotal O&M Cost):	**$971,187**
				TOTAL O&M COST:	**$5,827,123**
III. PERIODIC COSTS				**Discount Rate**	**1.9%**
5-Year Reviews		**Annual Cost**		**Discount Factor**	**Net Present Value**
48	Year 5	$25,000	YR	0.91	$22,755
49	Year 10	$25,000	YR	0.83	$20,711
50	Year 15	$25,000	YR	0.75	$18,851
51	Year 20	$25,000	YR	0.69	$17,158
52	Year 25	$25,000	YR	0.62	$15,617
53	Year 30	$25,000	YR	0.57	$14,214
				TOTAL PERIODIC COST:	**$109,304**
				TOTAL ESTIMATED COST:	**$62,557,377**
				ROUNDED TO:	**$63,000,000**

This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the projected cost.

Unit prices are based on 2015 dollars.

All volumes represent in-place measures.

Where not otherwise noted, unit cost is based on past project experience.

Mobilization/Demobilization includes, but is not necessary limited to, transportation of personnel, equipment, and materials to and from the OU, temporary utilities and services (i.e., electrical, water, telephone, sanitary), construction trailers, etc., that is with winter shutdown.

CY = Cubic Yard; LF = Linear Feet; LS = Lump Sum; SY = Square Yard; AC = Acre; EA = Each; TN = Ton; WK = Week; MO = Month.

Item Notes (where applicable):

1. Pre-construction survey includes costs associated with performing an aerial survey, supplemental field survey, in-field property boundary delineations, field marking OU features to be protected (e.g., monitoring wells), and cross sections within Portage Creek prior to construction.
2. Air monitoring unit cost assumes that monitoring activities are required during COC-containing material handling only (e.g., excavation, consolidation, subgrade preparation).
6. Clearing and grubbing unit cost is based on cutting and chipping of medium to heavily forested area and grubbing of stumps and other miscellaneous debris within the areas subject to consolidation and final cover system.
7. Temporary steel sheeting cost estimate is based on the assumption that approximately 1,200 linear feet of 15-foot long steel sheeting will be installed to facilitate earthwork activities along the bank of Portage Creek adjacent to the Monarch HRDL.

TABLE 7

Cost Estimate for Remedial Alternative 2D

Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site

Item No.	Description	Estimated Quantity	Unit	Unit Cost (Labor and Materials)	Estimated Cost
12	Soil removal and consolidation quantity represents the total quantity of in-situ material requiring excavation prior to consolidation within the Former Type III Landfill, Western Disposal Area, and Monarch HRDL consolidation areas. Soil removal and consolidation cost includes excavation and loading of COC-containing materials, onsite transport to placement area within the consolidation areas, and placement and compaction in 12-inch lifts within the consolidation areas. Estimated quantities are based on removal and consolidation of approximately 190,000 cubic yards of material along the peripheral areas of the Former Type III Landfill and the Western Disposal Area (including the Panelyte Property, Panelyte Marsh, and Conrail Property), approximately 170,000 cubic yards from the Monarch HRDL, and approximately 99,500 cubic yards of material from outlying areas.				
13	Confirmation sample quantity assumes that all soil removal areas will be sampled on a 50-foot by 50-foot grid to confirm removal of COC-containing material.				
14	Estimated quantity and cost is not based on calculation, rather it is an estimate based on site topography and the potential for sheet pile removal based on slope stability considerations. Lineal footage and costs to be determined during design phase.				
15	Estimated quantity is based on a setback 30-foot-wide along a linear distance of 2,100 feet along Bryant HRDL/FRDLs and Portage Creek. Estimated excavation depth is 8 feet based on nearby borings.				
16 - 25	Final cover quantities are based on the following estimated areas: Former Type III Landfill - 10 acres, Western Disposal Area - 12 acres, and Bryant HRDLs/FRDLs - 20.7 acres.				
17	Soil grading layer cost estimate is based on an assumed 6-inch-thick layer of select fill covering the entire consolidation/cover system areas and is the first layer of the earthen cover system.				
18	Geotextile separation layer cost estimate assumes utilizing a non-woven geotextile covering the entire cover system areas, and includes an additional 20% material quantity to account for overlap and wrinkles. Unit cost is based on information provided by geotextile manufacturer.				
23	Soil protection/drainage layer consists of a 2-foot-thick layer of sand covering the entire cover system area.				
24	Topsoil layer consists of a 6-inch-thick layer of topsoil covering the entire cover system areas.				
25	Seed and mulch cost estimate is based on seeding and mulching the entire area subject to consolidation/final cover system.				
26	Slurry wall costs include all components of design and construction. Groundwater collection and treatment (Contingency 2) not costed here as the slurry wall cost will be higher.				
28	Total length of the vegetated swale is based on a conceptual cover system layout prepared for cost estimating purposes only.				
29	Total length of the riprap-lined swale is based on a conceptual cover system layout prepared for cost estimating purposes only.				
31	Total length of culvert piping is based on a conceptual cover system layout prepared for cost estimating purposes only.				
32	It is anticipated that subsurface drainage would be installed at the interface between the consolidation area and the existing Bryant HRDLs and FRDLs liner system. Liner system grades at the interface are assumed to slope downward on a 4 on 1 slope forming a v-notch channel containing the subsurface drainage piping.				
33	Stormwater basin unit cost represents an average per basin cost, which was developed from a conceptual stormwater basin configuration.				
34 - 38	Restoration quantity assumes approximately 22 acres of soil removal area, located outside the limits of capping, as specified in the following: Former Type III Landfill - 3.6 acres, Western Disposal Area - 3.6 acres, Bryant HRDL/RDL - 1.4 acres, Monarch HRDL - 6.8 acres, commercial properties - 5.3 acres and Residential/MHLLC-Owned properties including Golden Age) - 1.5 acres.				
35	Estimated backfill quantities are based on the volume of clean fill material that will be required to backfill the peripheral soil removal areas located outside the limits of capping to appropriate subgrade elevation. An estimated 50,000 cubic yards will be used to backfill the Monarch HRDL. Actual quantities will be determined during the design.				
36	Topsoil quantity is based on covering approximately 42 acres of soil removal area, located outside the limits of capping, with 6 inches of topsoil.				
37	Seed and mulch quantity is based on covering the 42 acres of topsoil placed over the outlying soil removal areas, as necessary to promote vegetative growth.				
38	Permanent access road quantity based on an assumed 8,000 linear feet of newly constructed road that will be required to access various portions of the cover system area for maintenance purposes.				
42 - 47	Net present value (NPV) factors calculated using the following equation: $$NPV = I_0 + \frac{I_1}{1+r} + \frac{I_2}{(1+r)^2} + \ldots + \frac{I_n}{(1+r)^n}$$ r = Discount rate (expressed as decimal) n = Number of years from present				